

## Nerve net activity in the anemone *Nematostella vectensis*

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During millions of years of evolution, nervous systems greatly diversified and complexified in terms of structure and activity patterns. Nervous system complexity has been extensively investigated in model organisms such as the fruit fly *Drosophila melanogaster* and nematode *Caenorhabditis elegans*, which both belong to bilaterians clade where more than 95 % of species are found in. Sister group of bilaterians, cnidarians such the emerging model organism *Nematostella vectensis* do not possess a condensed structure called commonly brain but possess a diffused simple nervous system called nerve net. Our behavioral analysis suggests that *Nematostella* can display complex behaviors, which are controlled by their nerve nets, similarly to what is found in bilaterians. To uncover associated neural circuits activity, we introduce the first genetically-encoded calcium sensor tool to monitor neuronal activity in vivo in *Nematostella*. These results are a major step forward for a deeper understanding of the functioning of the *Nematostella* nervous system and the ways in which it controls specific behaviors.

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